AN ADDRESS

By L. F. LOREE,

President, The Delaware and Hudson Company,

at the

Christening of D. & H. Locomotive "1400,"

The Horatio Allen

at Colonie, N. Y.

December 4, 1924

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REMARKS OF L. F. LOREE, PRESIDENT, THE DELAWARE AND HUDSON COMPANY, AT CHRISTENING OF D. & H. LOCOMOTIVE "1400," COLONIE, N. Y., DECEMBER 4, 1924

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THIS occasion invites attention to a marked contrast in the element of time. While the business of steam transportation is one of hazard, it is also one that appeals especially to men of active temperament and physical vigor. It is a pleasure to have here with us today men who had been on the payrolls of this Company for more than fifty years before retiring from active service to continue their relations as pensioners. On the other hand, we are faced with the startling youth of the industry itself when we realize that Horatio Allen came to this service in adult life with a training and an education that marked him among his fellows, and that today our ceremonies have been graced by Horatio Allen's granddaughter. A span of three generations embraces the entire history of steam transportation.

When, more than a century past, The Delaware and Hudson Company secured its charter, a contest was arising between the rope haulage system of transportation and the independent unit system of transportation, and since that time the advantage has fluctuated, now with one and now with the other.

When the Company built its railroad from Carbondale over the Moosic Mountains to Honesdale, it used the rope haulage system on its twelve inclined planes. Over the so-called levels between the planes it moved its cars by a unit system; namely, horses, and, on descending grades of from 44 to 72½ feet per mile, by gravity.

At that time the steam locomotive was just being developed. On the recommendation of its Chief Engineer, Mr. John B. Jervis, the Company, with great courage, decided

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to test out that system of unit haulage. Mr. Horatio Allen, one of its engineers, was commissioned to go to England and contract for four locomotives. All of these were subsequently delivered on the Company's wharves at Kingston on the Hudson—one from the works of Robert Stephenson & Company, Newcastle, a company still in the business of manufacturing locomotives; the other three from the works of Foster, Rastrick & Company, of Stourbridge. One of these latter, the "Stourbridge Lion," was set up at Honesdale, and on the 8th of August, 1829, nearly two months before the celebrated Rainhill contest, was operated by Mr. Horatio Allen, to whose name, character and professional ability we today do honor.

The Liverpool and Manchester Railway early in 1829 employed Mr. James Walker of Limehouse, a distinguished engineer, and Mr. J. U. Rastrick of Stourbridge, a locomotive builder, to report on the respective merits of the locomotive engine and fixed engine. Their report was generally, though not very decidedly, in favor of the rope haulage system. It was with a view to meeting the wishes of George Stephenson, their Chief Engineer, and to give the locomotive one more chance, so to speak, that the Company resolved to invite a competition for a prize of £500. The conditions were advertised in April, 1829, the trial taking place in October, 1829. It was, as is well known, won by the "Rocket," the nineteenth locomotive built by the firm of Robert Stephenson & Company. The name "Rocket," by the way, grew out of a lawyer's sarcastic remark that "People would as soon mount one of Colonel Congreve's rockets as one of these railway coaches." George Stephenson was not the man to dodge anyone's attack.

The success of the "Rocket" was due to the combination of the tubular boiler, suggested by Henry Booth, and an improved and suitably proportion blast pipe, first used by Richard Trevithick in his original locomotive which had its first trial on Christmas Eve, 1801. The success of the

"Rocket" at Rainhill led to the rapid introduction of the unit system of haulage in all parts of the world, and it remains today the outstanding instrument of transportation.

This is not the place to recount the service of steam railways to mankind. It is enough to suggest that they were the indispensable condition of the abolition of slavery and equally the means by which famines have been abolished. They made of a primitive agriculture a world commerce, they broadened in every way the comfort and security of life. They have made the civilized lands the mother countries of the world.

On July 27th, 1884, electricity was applied in the movement of street cars at Cleveland, Ohio, and came rapidly into use. This is, in essence, a rope haulage system. There is the great central power station; the dynamo, standing for the winding drum; and the trolley wire providing the circuit for the electric current, attaching to which the vehicle is drawn along. This system was so superior that it drove the individual unit system—the horse-drawn car—out of service and completely supplanted it in city and interurban transit.

About 1898, with the application of the internal combustion engine to road vehicles, there began the development of the automobile. In its turn this individual transportation unit, whether used as a pleasure car, as a motor bus, or as a motor truck, has rapidly driven interurban trolley lines and the city lines of meager traffic out of service, they being no longer able to preserve their financial solvency.

There is the further possibility that even tomorrow a cheap, durable and fool-proof electric storage battery may be invented, enabling the use of its power by an independent unit in transportation, completing the discomfiture of the rope-haulage trolley car.

While this contest may be expected to continue long in the future, perhaps usurping and stabilizing itself in restricted fields, the dominance in the larger aspect will depend largely upon the ability, genius, courage and tenacity

of the exponents of one or the other method of transportation. For myself, I have an abiding faith that for the main purposes of the railroad—the transportation over long distances of heavy articles—the unit system of transportation will be the dominant one.

The engine which has today been christened the "Horatio Allen," in honor of the man who ran the first locomotive on the Western Hemisphere, is a step in the direction of insuring this position. The familiar self-contained type of multitubular boiler for steam locomotives, in combination with the superheater, has been retained. Instead of the usual water leg firebox with its undesirable flat sheets, staybolts and sluggish circulation of water, the firebox of the "Horatio Allen" has been built up of self-supporting cylindrical structures. These are in the form of drums and tubes disposed horizontally and disposed vertically, requiring no stays, which are directly exposed to the furnace heat and which not only "split up" the boiler water into small streams but also provide for its rapid circulation, thereby enabling quick absorption of heat and release of the steam bubbles.

When water is burst into steam it expands to 1700 times its original volume. It is this high expansive force and the inverted ratio of its pressure to the space it occupies that is utilized in the locomotive engine. In working steam expansively the extent of the application depends mainly on the density and pressure of the steam drawn from the boiler.

Liquid water, not under pressure, may be raised from melting to boiling point with no more than 180 units of heat, called "sensible heat." But its peculiarity is that it cannot be made to burst into steam until 970 more additional heat units have been added. This is called "latent heat of evaporation," and its production multiplies the cost almost 5½ times.

This is the great cost in producing steam, whether of high pressure or of no pressure at all. It requires comparatively little additional heat to generate steam under pressure. Thus, it takes about 1150 heat units to raise water

into steam at no pressure. But to raise it to 200 pounds pressure—which is now the general locomotive practice—requires only about 49 additional heat units. To further raise it to 350 pounds, and thus secure 75% more power, requires less than 7½ additional heat units. It is this high pressure of 350 pounds that will be carried by the "Horatio Allen"; and it is the economy of producing additional power by raising the pressure of the steam that this locomotive will realize.

To make this possible, the pressure-containing parts of the boiler, superheater, cylinders, piping and other connections have been correspondingly strengthened. In fact, a higher factor of safety has been used than is ordinarily provided.

In order to limit to the lowest terms the problems involved, we have taken the most popular of our Consolidation locomotives. We have made no material changes other than those indicated, except that the steam is used twice, i. e., it is expanded in the high pressure cylinder on the right side, then exhausted into a receiver, and expanded a second time in the low pressure cylinder on the left side, before it is exhausted into the stack. By this means the steam is more fully utilized before it leaves the cylinders.

In the construction of this locomotive a small auxiliary engine, known as a "booster," has been attached to the tender. This device enables great concentration of power in starting the train and in moving it over comparatively short stretches of heavy grade. It is hoped that the "Horatio Allen" will develop one-third more haulage capacity, with one-third less consumption of fuel and water, than the corresponding Consolidation locomotive. If these results are realized they mark a substantial advance in the efficiency of the unit system of transportation. Notwithstanding the greater heat in the boiler, the precautions taken in lagging its back head will, we believe, reduce the temperature to which the engine crew is exposed.

In the conditions of employment since the beginning of railroading, while the fireman has not been without benefit, there has, I think, inured to him a lesser proportion than to his associates. It is not the least of the merits of this design that for the same result his labor of coal handling will be lessened by more than one-third.

The "Horatio Allen" is today what the locomotive was when Zerah Colburn described it in the middle of the last century—a combination of three distinct arrangements. The source of power lies in the boiler and firebox; the cylinders, valves, pistons and the connections are the means by which the power is applied to produce motion within the machine; and the wheels, by means of their adhesion to the rails, enable the exertion of the tractive force, securing the locomotion of the machinery which impels them, and from their surplus power above what is necessary to move the locomotive alone, to haul also the great load behind it upon the rails.

The "Horatio Allen" epitomizes the relations of the three elements of that industrial organization which distinguishes our civilization from all that have preceded it. There have been many definitions of truth. The one that seems to me most adequate is that "truth is things seen in relation." Complex as are the relations of management, capital and labor in the wide expanse of industrial organization, I am confident that if we look steadily and clearly we can mark them out and define them. If we can see them, we shall see the truth and the truth shall make us free.

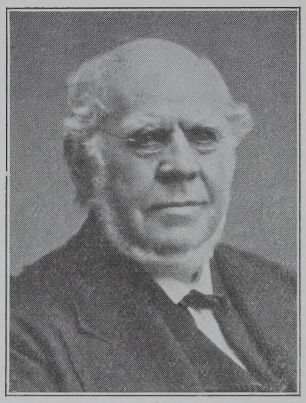
This locomotive is a creation of management. The conception of the plan is basic, fundamental; and it is the organization, energy and direction of management that have given it effect.

This locomotive is a depository of capital. It is a characteristic of wealth that its owners are in possession of real opportunities of consumption for speedy enjoyment, or of reservation for future enjoyment, or of employment for purposes of production. It is wealth that is reserved and applied

to production under the direction of management that is generally called Capital, and this reservation demands on the part of the owner great sacrifice and force of character.

But this locomotive, the "Horatio Allen," fine an example as it is of the art, striking as it is in its combination of management and capital, is an inert thing except in the hands of labor—labor selected, trained and set into orderly array by management. He who looks with discerning eye to the contribution of labor, will fix his attention not on the output of physical energy, which in comparison with the power of this giant machine is but a feeble emanation, but rather on qualities far more ennobling—the complete discipline, the cheerful devotion to duty, the service carried on under every adverse circumstance, whether in wind and storms of rain and snow, in fog, in the blackness of night or the beauty of the day; the high intelligence brought to the safeguarding, as well as the handling, of the movements entrusted to its charge.

It is the exercise of these and other like qualities that have won for the locomotive crew the outstanding position they occupy in the unit transportation service.



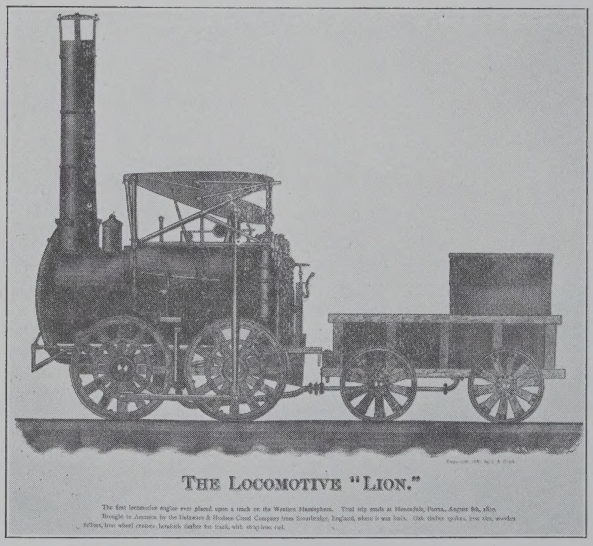
HORATIO ALLEN

CHRISTENING OF D. & H. LOCOMOTIVE "1400"

The Horatio Allen

Sponsor, MRS. HARLESTON CORBETT LEWIS
(Granddaughter of Horatio Allen)

Colonie, N. Y., December 4, 1924



THE LOCOMOTIVE "LION."

The first locomotive engine ever placed upon a track on the Western Hemisphere. Trial trip made at Honesdale, Penna., August 8th, 1829.
Brought to America by the Delaware & Hudson Coal Company from Stourbridge, England, where it was built. Oak timber sprites, iron rim wooden
rollers, iron wheel centers, hemlock timber for track, with strap iron rail.

HORATIO ALLEN

HORATIO ALLEN was born at Schenectady, New York, in 1802. He entered the service of The Delaware and Hudson Canal Company in 1825. He was selected by the Company as its agent to purchase locomotives and railroad iron in England, and in January, 1828, proceeded to that country to carry out his commission. He purchased four locomotives, one of which, "The Stourbridge Lion," has become famous as being the first locomotive to run upon a railroad track in the Western Hemisphere. Mr. Allen at this time was but twenty-six years of age and his selection for this important undertaking indicates his unusual ability. After leaving the service of the Company he occupied many positions of prominence in the engineering world and died December 31, 1889, at the age of eighty-seven years.

"The Stourbridge Lion" was built by Foster Rastrick & Co. of Stourbridge, England, and cost, delivered in New York City, $2,914.90. It was supported on four wheels of four feet diameter and carried a boiler four feet, two inches in diameter and ten and one-half feet long. In working order the locomotive weighed about eight tons.

"The Lion" arrived in New York, May 13, 1829, and was shipped to Honesdale, Pa., by water, arriving at destination the latter part of July. On August 8, 1829, with Horatio Allen as engineer, "The Lion" made its famous trial trip for a distance of about three miles from Honesdale and return.

THE HORATIO ALLEN

THE Horatio Allen, designed by Mr. John E. Muhlfeld, Consulting Engineer of The Delaware and Hudson Co., was built at the Schenectady Works of The American Locomotive Company in the year 1924.

It has a combination water and fire tube boiler, having a working pressure of 350 pounds, some 150 pounds greater than the average American locomotive. It takes 1150 heat units to raise water into steam at no pressure. To raise it to 200 pounds pressure—which is now the general locomotive practice—requires 49 additional heat units. To further raise it to 350 pounds, requires less than 7½ additional heat units. Consequently, for this small amount of additional heat, 75% greater pressure is made available for power development. This is the basic principle governing the design of the boiler.

Steam is taken into the high pressure cylinder on the right side, exhausted into a receiver pipe going over the top of the smoke box and again used in the large cylinder on the left side, from which it is exhausted into the atmosphere, thus by the use of steam a second time effecting economy.

This locomotive has developed in actual service 75,000 pounds draw bar pull working compound, 95,000 pounds working simple and 105,000 pounds with booster cut in at 150 pounds pressure. This is the greatest draw bar pull exerted with a four coupled locomotive of which we have a record.

COMPARATIVE DATA

(Actual and Calculated)

The Stourbridge Lion		*The Horatio Allen*
Height to top of stack	15′ 0″	15′ 0″
Wheel Base	(About) 4′ 6″	Engine 29′ 0″ Engine and Tender 65′ 7¾″
Weight-working order	16000 Lbs.	Engine 348000 Lbs. Engine and Tender 545800 Lbs.
Cylinders	Dia. 8¾″ Stroke 36″	High Pressure 23½ x 30″ Low Pressure 41 x 30″
Drivers-Diameter	48″	57″
Tractive Power	1750-2000 Lbs.	Compound 70300 Lbs. Simple 84300 Lbs. With Booster 19700 Lbs. added
Heating Surface	68-75 Sq. Ft.	3200 Sq. Ft.
Water Capacity-Tender	100 Gals.	9000 Gals.

SPEAKERS

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Mr. S. H. HUFF
Assistant Grand Chief Engineer,
Brotherhood of Locomotive Engineers

Mr. J. E. MUHLFELD
Consulting Engineer, The Delaware and Hudson Co.

Mr. TIMOTHY SHEA
Assistant President,
Brotherhood of Locomotive Firemen and Enginemen

Mr. J. G. BLUNT
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Mr. A. G. PACK
Chief Inspector, Bureau of Locomotive Inspection,
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